

HOMEWORK 1 – GROUP 3

1-) We were asked to prove the given inequalities and show that the given relation is equivalent to the others. They use methods discussed in the courses and references. Their proofs are clear and easy to understand.

2-) They use the definition of convexity and define a function $g(x)$. Using its derivative with respect to α they prove the theorem. They use the result in problem 2.a in problem 2.b. Part c follows straightforward. It is neatly written and easy to understand.

3-) We were asked to define and discuss sublinear, linear, superlinear, and quadratic sequences. They explain them well and give examples for each case. They also mention about differences and benefits of each case.

4-) In this question we were asked to discuss which method can be used for the given minimization problem. They proposed Newton's method for the first problem. In the next one, they mention that stochastic gradient can be used to overcome high dimension issue. In the next parts, they mention the proximal algorithm and projected Gradient Descent methods. I believe the explanations are fitting the cases and they are sufficient. They have supplied the necessary reference for their explanations.

5-) Similar to most proofs for this question in the internet and references, they define a $g(x)$ function, they use given properties and a result that was obtained in problem 2.1. With the help of these, they prove the relation. I believe the proof is neat and understandable.